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ABSTRACT

This evaluation focuses on the use of computers, telephones, broadcast video, and related devices to support instructional activities and administrative functions in the Des Moines (Iowa) Independent Community School District. The findings are presented in five parts: (1) Context Evaluation--History and Recent Improvements (video and instructional and administrative uses of computers); Telecommunications (telephone system); Fiber Optic Networks (telephones, two-way video classes, instructional support systems and networks); and Policies and the Department of Information Management; (2) Input Evaluation--Budget; Inventory; Number of Computers Used for Instruction and Administration; Telecommunications; Staff Support; and Cost of Inservice; (3) Process Evaluation--Technology Planning, Purchases, Repair and Support; Telecommunications; Consultation Assistance; Mid-Iowa Computer Center; and Current Year Goals; (4) Product Evaluation--Technology Planning; Inventory; Telephones and Networks; Consultation Assistance; Instructional Management System; and Mid-Iowa Computer Center; and (5) Future Planning--Technology Planning, Purchases, and Initiatives; Telecommunications; and Consultation Assistance. A diagram showing how each of the schools in Des Moines is connected to the Mid-Iowa Computer Center and lists of the Technology Advisory Committee, the Technology Committee, and the Technology Consultation Committee are appended. (ALF)

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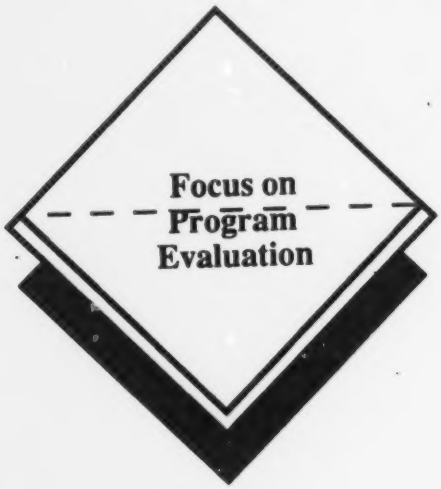
TECHNOLOGY REPORT

Establish A Baseline for Planning and Growth

Department of Information Management
Des Moines Independent Community School District
1800 Grand Avenue
Des Moines, Iowa 50309-3399

June 2, 1992



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Des Moines Independent Community School district
Des Moines, Iowa

June 2, 1992

DISTRICT MISSION STATEMENT

The Des Moines Independent Community School district will provide a quality educational program to a diverse community of students where all are expected to learn.

DEPARTMENTAL RESPONSIBILITY STATEMENT

The Department of Information Management provides leadership and direction for the district's planning, technology, accountability, program evaluation, research, testing/assessment and student information operations.

CONTEXT EVALUATION

Technology

Introduction

Technology Definition

Educational technology is defined "as a complex, integrated process involving people, procedures, ideas, devices, and organization for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems involved in all aspects of human learning." Taken literally, almost any system that involves people and devices— books, chalk boards, computers, etc.— is a form of educational technology. This definition points out that technology is more than computers; however, the scope of the definition is too broad for the purpose of this report. The focus of this evaluation will be on the use of computers, telephones, broadcast video, and related devices to support instructional activities and administrative functions. Detailed information on audio-visual technology — televisions, VCRs, overhead projectors, etc. — was provided in the Program Evaluation: Media Services, presented to the Board of Directors in January, 1991.

History and Recent Improvements

Video

KDPS/ KDIN -TV

The Des Moines Independent Community School District has been an historic leader in using technology as a teaching tool and as an object of learning. In 1958, Technical High School offered a wide range of technology-based courses. Two of the programs were radio and television broadcasting. The district managed KDPS radio and television starting in 1959. In the early 1980s, KDPS television was sold to the Iowa Public Broadcasting Corporation and is now KDIN-TV, public television for central Iowa. Also during the 1950s, students were enrolled in a wide assortment of courses that were broadcast through KDPS-TV to all high schools. Students watched and listened to instructors on TV-monitors located in the classrooms.

Computers-Instructional

Programming

Students at Technical High School began learning computer programming in 1962 as a part of a vocational computer programming course. Many of the students had the opportunity to go directly from high school into a computer programming position. Others tested out of almost two full years of a computer science major (at Iowa State University).

micro-computers

Microcomputers were used by Des Moines' teachers before International Business Machine (IBM) introduced their first microcomputer in 1981. Early efforts to use computers in the curriculum were oriented around teaching about computers. During the 1981 school year, computer labs were developed in all of the middle and high schools. The first courses were typically to teach keyboarding and computer programming. Students also learned valuable "information age" skills such as word processing, information searches, telecommunications, and data analysis.

teaching and learning with computers

During the 1985-1986 school year, a kindergarten to fifth grade (K-5) computer curriculum was developed. Computer software was identified that matched the K-5 curriculum. Teachers attended inservice classes to learn how to integrate the computer software into the daily instructional program. The K-5 curriculum altered the focus on computers from "teaching about the computer" to "teaching and learning with computers." Teachers saw early on that they were powerful tools for instructional purposes. At the elementary level, the one-computer per classroom concept was being developed.

first large purchase: Commodore 64

During the early 1980s most instruction centered on teaching about computers. Computer programming was considered to be the primary need that should be added to the curriculum. In 1983, enough Commodore 64 computers and Commodore Vic-20s were purchased to have a computer lab in each secondary school. The middle schools taught keyboarding and BASIC programming during a nine week unit in seventh grade. Students could elect to take a semester course in eighth grade. At the high school level semester courses in keyboarding, word processing, and BASIC programming were offered. In 1985, Apple //e computer labs were purchased for the five comprehensive schools to provide additional computers for word processing and programming courses.

Des Moines Plan

During 1986-1987, district staff reviewed computer software that could be used in the one-computer classroom. Software was identified that provided drill and practice, tutoring, and simulation learning experiences related directly to the district's curriculum. During the 1989-1990, enough Apple //e computers were purchased to provide all elementary schools with a minimum of five computers. Many of the schools had more computers due to PTA/PTO contributions.

The Des Moines Plan provided approximately two Apple //e computers for each program teacher during the fall of the 1987-1988 school year. They used the same software that was identified for the one-computer classroom. The School Within a School program (SWS) also purchased four Apple II GSs for each high school SWS room.

High school labs

Starting in the 1988-1989 school year, Macintosh computer labs were installed in two high schools and five middle schools to replace the Commodore equipment. The labs were primarily for keyboarding and word processing skills. Macintosh labs were installed in all the secondary schools during the 1989-1990 school year except for Roosevelt.

Adult/ Continuing and Community Education Department

During the 1989-1990 school year, Adult/Continuing and Community Education Department, in partnership with Upper Iowa University, installed a computer lab at Roosevelt. The computers were what are commonly called IBM "clones." This means the computers were able to use the same programs or software as the IBM microcomputer.

NovaNet

Des Moines Area Community College approached the Des Moines schools during the 1987-1988 school year about a project that combined computers, satellites, telephones, and instruction. The system is called NovaNet. Instructional software resides on a computer at the University of Illinois. Through satellite communications the signal is transmitted to sites that can use a satellite dish to receive the signal. The return signal goes back through telephone lines to close the loop. Using microcomputers, students study a wide range of subjects. Teachers can preset instructional materials. At the Des Moines Alternative Schools, students study subjects they need to complete high school graduation requirements or subjects that will assist with a GED certificate. At Central Campus students in English as a Second Language learn English skills, special education students can use drill and practice units to reinforce skills, and Central Academy students can use simulations to explore new subjects and concepts.

By using grants or building funds, teachers have started using computers to assist with instruction. Several math teachers use software designed to show the dynamic relationship between data and plotted graphs. Social Science teachers use software such as Oregon Trail to assist students in developing thinking skills. They also use data bases to locate information that is helpful for understanding important concepts, e.g., locating the export data for a group of countries as part of a report on export patterns.

Computers - Administrative

Mid-Iowa Computer Center Services

Computers are also used to support administrative operations. Mid-Iowa Computer Center (Mid-Iowa), a regional support center that serves school districts all over Iowa, provides many data processing services to the district. The center was organized in 1979, as an Iowa Code 28E organization by Heartland Area Education Agency 11(AEA 11), Area Education Agency 6, and the Des Moines Independent Community Schools. Mid-Iowa's operations have been funded in part through an annual agreement with the Educational Services Division of Heartland Area Education Agency. Additional funds are received from member school district that use services beyond the basic allocation funded by AEA 11. The district uses several services to include some of the following:

a) Pupil accounting. Student information and test data are entered at the buildings into a data base. Reports and other vital statistics can be generated from the database.
b) Student scheduling and attendance. Middle and high school schedules are generated by Mid-Iowa Computer Center. The system also prints mark (grade) reports.
c) Financial accounting. The district's budget, expenditures and other accounting functions are processed at Mid-Iowa.
c) Custom systems. Mid-Iowa staff work with district staff to develop systems and reports that are needed by the district.

Mid-Iowa support for testing services

One of the services provided by Mid-Iowa is support for instruction. During Plan for Excellence planning in 1985-1986, several committees identified the need to improve the methods for processing district tests. At that time, tests were administered at the buildings, the answer sheets were delivered to the Evaluation Department where they were grouped according to test, checked for major problems, and then delivered to Mid-Iowa Computer Center for processing. The results were returned to the Evaluation Department, which in turn distributed them to the buildings. The whole process took about six weeks. The time lag was not acceptable. Teachers wanted to know student test results within one or two days of giving the tests. A new system was needed to move information between the buildings and Mid-Iowa.

During the fall of 1985, a response to the district's request for proposal (RFP) by a local computer dealer was approved to install microcomputers and scanners that would connect all the schools to Mid-Iowa. Data telephone lines provided the link between the computers in the schools and Mid-Iowa. Computers in the buildings were connected by way of telephone lines to Mid-Iowa. See Appendix A for a description of how microcomputers and telephone lines are linked to Mid-Iowa. The system was designed primarily for building staff to scan district tests, generate building reports immediately, transfer the test data to Mid-Iowa for processing, and then within two days, download a file and print a report generated by Mid-Iowa onto the building computer. Once all test data were collected by Mid-Iowa, district summary reports could be generated and the students' scores recorded in a central data base. The RFP was completed by the fall of 1989.

The new system also provided the means to introduce several "on-line" services. The first was a shift from using batch processing — data are recorded on forms and then keyed or read into the computer at Mid-Iowa— to on-line operations. School staff were able to enroll students, change student data, and view data.. The second application was to record daily attendance. High school and middle schools recorded attendance by period and elementary schools recorded by half day. The new system increased accuracy since the staff who collected the data also put it into the computer. They also had the ability to correct errors when discovered instead of waiting two weeks for corrections slips to be processed.

New services... Satisfying one need provided new tools to deal with other needs

Additional on-line systems have been developed: annual central stores requisitions, annual budget, facility management repair work orders, class and student scheduling, and middle school destination report.

Starting in 1989-1990 school year, a second computer was installed in half of the elementary schools. The second computer--an Apple Macintosh--made it possible for the scanning system to be moved to a location that was more convenient to teachers. The addition also provided school secretaries with a computer to do word processing, local data base activities, and use the systems on Mid-Iowa. The second computer and a new style of printer were installed in the remainder of the elementary schools during the 1990-1991 school year. The new type of printer used ink jets instead of lasers or pins - dot matrix - to put ink on paper. The quality of the printed page was not quite as good as a laserprinter, but it was much better than dot matrix.

Counselors at three high schools plus Hiatt and Callanan Middle Schools received Macintosh computers and printers during the 1990-1991 school year. They used the computers to do word processing and Mid-Iowa activities. The remainder of the middle and high school counselors received computers during the 1991-1992 school year.

Counselors now on-line

Boundary planning and school bus scheduling... EDULOG

School transportation routes have been created manually since buses were first used to transport students. The difficulty of a manual system for a district the size of Des Moines is the amount of time that a new route manager needs to learn the system. Also, there is some concern that manual routing does not allow planners to compare the merits of several alternative routes. During the 1989-1990 school year the Education Logistic (EDULOG) student planning and bus routing systems were implemented. The system uses a primary microcomputer called a file server to store all information. Three other computers are used by operators to enter data and use the system. One of the characteristics of the system is that each student's address is matched to a "geocode". The geocode is a coordinate that allows a computer to generate a map to show where students live. Distances from bus stops can be calculated and distances can be determined along streets. The student planning subsystem of EDULOG has been very useful in showing the effects of moving school boundaries. The bus transportation subsystem had not been implemented by fall 1991. Once the system is used to route buses, alternative routes can be found with the goal of reducing the number of buses that have to be used at any one time.

Telecommunications

Telephone networks

Telecommunications refer to systems that use telephone lines to carry voice and data. These are powerful tools used for instructional and administrative tasks. Computers and telephones can be combined to provide a way to send information electronically.

Mid-Iowa's on-line services, telecommunication network, were previously described. Telephone networks allow computers to talk to computers. The capability of connecting computers in schools with Mid-Iowa proved to be the solution to several problems related to getting information to and from buildings to a central computer.

Electronic Mail

A second example of using a combination of telephone lines and computers is electronic mail. A district-wide system was started in 1983. There was at least one microcomputer and telephone modem in each building. This allowed school staff to use a computer to call a computer at 1800 Grand and leave private messages for another

individual, or to "post" a notice that all could read. The primary users of the system were special education consultants and school secretaries. In 1988, the system was shut off when the computer used to store messages failed and it was not cost effective to repair. However, the experience demonstrated that staff will use computers to communicate, electronic mail systems need to be easy to use, have the ability to address a message to more than one person, and have some way to confirm that a message is received. This early system did not have these features.

Reach out and learn...

Telecommunication is now being used by teachers and students to explore outside the classroom. National Geographic Society Kids Network (NGS KN) is an international network of schools, universities, and federal science agencies that use computers, modems and telephones to collaborate on wide range of activities. The system allows students to participate in experiments conducted nationwide. One unit, titled "Acid Rain" involves students in hundreds of communities. Rain samples are collected, acid levels are measured, and the data are transferred to NGS KN via modem. As data are entered into the system they are analyzed and the results are made available to students on the system. The analyses are retrieved from NGS KN, and by using software on the computer, students can create maps showing the levels of acid in all regions of North America. Students can also send and receive letters from students outside Des Moines. Elementary and middle school level students use NGS KN.

A second system that allows students to go beyond the classroom is the AT&T Learning Network. Elementary and secondary students and teachers join Learning Circles. Through computers and modems participants work on cross-curricular projects that promote student cooperation and learning. Teachers are able to exchange ideas with other teachers. Learning Circles are usually a group of eight classrooms scattered throughout the United States, Canada, many European countries, India, Egypt, Australia, and Japan. Students truly have a classroom without solid walls. This system is being used at Perkins Elementary School.

Telephone System

Opportunity to make choices

The Bell System - AT&T breakup caused difficulties for many institutions but it also provided many opportunities. The Des Moines Public Schools found that the choices and opportunities outweighed the difficulties, since the district had to decide to rent or buy the existing telephone system. There were now two companies to work with for telephone service. Phone service was no longer the sole domain of the regulated telephone company. Competition and new technologies made it cost-effective for institutions to purchase and maintain their own telephone equipment. Two major telephone projects had their roots in this change.

The first telephone project started in August 1986. Prior to this time, the telephone switching equipment, wiring, and telephones at 1800 Grand were leased from the telephone company. After divestiture, all telephone equipment was owned by what is now AT&T and all telephones were leased. The wiring become district property, and US West supplied dial tone. Any change in service - moving an extension from one office to another - was an extra charge. Many times it was more cost effective to reassign a telephone number when departments moved instead of paying the telephone company to make the changes. A careful analysis of the leasing fees and an investigation into new digital phone switches showed that the district could replace all the leased equipment with purchased equipment and pay for the system in three to four years. A request for proposal (RFP) was awarded to Norstan Communications for a ROLM digital switch. Installation was completed during the August, 1986.

Cost saving was one long term benefit. The capabilities of a digital switch provided many new services:

a) Each administrator and each secretary were assigned a unique extension number. Before, departments shared two or three extension numbers.

b) Change order costs were reduced. A district employee can now "move" an extension in about ten minutes. Moving an administrator or secretary to a new office area no longer requires an expensive change order to the phone company that would take several days.

c) Touchtone phones increased productivity by reducing the time it takes to "dial" and by providing additional features to the user. Calls can be transferred to any extension reducing the number of times a caller is told to call back on a different number to get the appropriate department.

d) Phonemail provides an electronic "voice box." Callers can leave a detailed message. Also, messages can be forwarded, saved, or return messages can be recorded.

e) The inside telephone system at Central Campus was replaced with telephones that had outside access.

A good telephone system is a necessity, not a luxury. This may seem like a trite statement, but recognition that something is important does not always translate into an action.

If teachers need to call parents, then they need a telephone

Teachers also need telephones to communicate with parents about students' progress. Yet, schools rarely had enough telephones available for teachers to use. The lack of access to telephones was a major barrier to teachers when they needed to call parents. Often only the "negative" calls were made, while "positive" calls were delayed or not made at all.

In January 1987, the district piloted the second major telephone project to address the issue of limited access of telephones by teachers. The building intercom systems at Madison Elementary and Merrill Middle schools needed to be replaced. The intercom replacement cost plus telephone leasing fees were not much less than the cost of purchasing and placing telephones in each classroom. The telephone systems which were purchased and installed at Madison and Merrill provided fully functional building intercom systems and a telephone in each teacher's room. Teachers were able to call parents without leaving their room to find a phone. They did not have to carry on a private conversation where others could overhear. A follow-up study conducted in 1988 indicated that teachers felt they had dramatically increased the number of direct conversations with parents. The most significant change in teacher communication was the increase in "positive" calls. Before the new telephone systems, most calls were negative in nature. After the telephones were installed, the number of both negative and positive calls increased, but the majority of calls were now positive ones. The most recent Facility Improvement Tax Levy

includes funds to put telephones in all district classrooms by the end of 1995.

Fiber Optic Networks

Telephones

Fiber optics... the light to the future

During the 1987-1988 school year, the district was able to take advantage of another relatively new technology that is causing a revolution in telecommunications. The new technology is fiber optics. Fiber optic cables are a collection of very thin glass strands that allow extremely focused light -generated by lasers-to carry a tremendous amount of information.

Connecting schools with glass and light...

The district began using a fiber optic system in 1987-1988 to provide cost effective telephone service. Fiber optic cables were being installed by MWR Telecom (formerly Iowa Power and Light) close to both 1800 Grand and East High School. The district was able to connect the telephone switch at 1800 Grand to East High School using MWR Telecom's fiber. Hiatt Middle School telephones were connected to East switch using leased copper cable. The new system replaced telephone switching equipment, telephones, and telephone lines leased from US West and AT&T. The cost of leasing the fiber and purchasing the switch equipment was repaid in three years because of the savings which resulted from owning telephones and switching equipment instead paying a rental fee to the telephone utilities. Since 1987, all district high schools have been added to the main telephone switch at 1800 Grand using fiber optic technology. In addition to the high schools, Meredith and Hiatt Middle Schools and Hubbell Elementary were added to the switching equipment located at Central Campus. A fiber optic network now connects all Des Moines high schools and the Food Service/Transportation Center. The fiber optic cable is leased from MWR Telecom. Fiber optic terminal equipment, owned by the district, is installed and maintained by district personnel.

It pays to invest in technology

Use of this telecommunications network has resulted in dramatic savings to the district. Over $1,000 per month is being saved at each high school location. The total savings now being realized by the district is more than $12,000 per month. Since 1987 the number of telephones in the district has increased greatly, while the monies expended to provide this service has remained nearly constant despite rising

telephone company rates. The MWR fiber is currently being used only for voice telephone and computer data, but it has sufficient capacity to serve all the voice, data and video needs of the district for the foreseeable future. The fiber is leased at a fixed monthly cost for a ten year period. This means that no matter how much information the fiber carries, the monthly rate remains the same. Existence of the fiber optic network permits the district much more flexibility, provides virtually unlimited capacity, and does so in a very cost effective manner.

Two-way Video Classes

I can see you....you can see me

Fiber optics can carry voice conversation, computer data, and television signals. During the 1987 school year, US West and the Des Moines schools started a pilot project called Fiber Optic Communications Instruction System (FOCIS). This system provided the vehicle for two-way video between the districts' high schools. The Board approved participation and the system was installed during fall 1987.

Starting in January 1988, Latin was taught between Lincoln and Roosevelt High Schools. The teacher never left Lincoln and the Roosevelt students did not travel to Lincoln. Since FOCIS was carried by fiber optic cable, the system provided a full motion color picture of network television quality where both the instructor and the students can see and hear each other. Students are able to interact normally and spontaneously with the teacher and with students at other locations without having to manipulate buttons, telephones or equipment. In 1989-1990 Urbandale High School was added to the network and Japanese was taught from Central Campus to both Roosevelt and Urbandale students. Latin was taught between Lincoln, Roosevelt, and North. During the 1990-1991 school year several high school courses were taught: Japanese was taught from Urbandale to Roosevelt; Latin was taught from Lincoln to Roosevelt and North; and Current Issues and French was taught between Lincoln and Hoover.

The Urbandale link made it possible for Adult/Continuing and Community Education to conduct adult or evening courses between Central Campus and Urbandale or Lincoln High School and Urbandale

starting in the 1990-1991 school year. Courses ranged from sign language, and nursing skills, to Italian, Spanish, Russian and French.

US West has informed the district that, under the terms of a Federal Court order resulting from deregulation, they can not provide this service after July 1992. They have proposed an alternative system and district staff are studying their proposal as well as investigating other methods of providing two-way video service. If a satisfactory replacement system is implemented, expanded course offerings, and staff development uses are planned for the fall of 1992.

Figure 1 shows a time line of telecommunications activities in Des Moines.

Figure 1

Telecommunications Activities Since 1958

1958	Tech Building at 1800 Grand Opens --KDPS Radio Established
1959	KDPS - TV Established
Summer 1983	First Electronic Mail System
Summer 1985	Began planning new telephone system
Fall 1985	Begin installing Mid-Iowa Administrative Data Network
August 1986	Install new telephone system - Administration/Central Campus
January 1987	Install phone in every classroom-pilot at Madison Elementary and Merrill Middle Schools
August 1987	Install first fiber optic link to East High and Hiatt Middle Schools
August 1987	Install first US West T-1 Circuit to Cowles
October 1987	Install Mid-Iowa Data network in half the elementary schools
Fall 1987	Install two-way video system at all high schools
January 1988	Video Classes Begin between Lincoln and Roosevelt High Schools
January 1988	District begins program of phone in every classroom, 7 buildings completed during 1988
September 1988	Install Mid-Iowa network in remaining elementary schools
February 1989	Fiber Optic service to Lincoln High
September 1989	Fiber Optic service to North High
January 1990	Begin installing phone/PA systems in 8 more buildings
February 1990	Expand ROLM telephone switch
May 1990	Fiber Optic Service to Hoover High and Meredith Middle Schools
November 1990	T-1/Fiber Optic Service to Samuelson Facility
December 1990	Fiber Optic Service to Food Service/Transportation
May 1991	Fiber optic to Roosevelt High School and Hubbell Elementary School

Instructional Support Systems

Continuous progress reporting... Instructional Management System Plus... IMS Plus

A pilot project was inaugurated during the 1990-1991 school year to test a computer-based instructional management system in seven elementary schools. Since 1979, several management systems were investigated but found lacking. In most cases, the systems were rejected because of cost or because they were too difficult to use. The National Computer Service (NCS) Instructional Management System Plus (IMS Plus) system was found to be adequate to monitor student progress in reading mathematics. As students complete an instructional unit, teachers give the students a test that measures the learning objectives for that unit. The answer sheets are scanned with the same scanner used to scan the district tests. The results are tabulated and stored in a MS-DOS based microcomputer. Teachers then generate reports that show group results or individual progress. The system records each student's pass or fail on each objective tested. The value of the system is that that there is a continuous monitoring of student progress toward stated objectives, but students do not have to take large tests that cover a wide range of learning objectives.

All buildings were connected to Mid-Iowa during the 1988-1989 school year. Since then, many new systems have been added as described later in this report. Building staff can maintain student information records, develop class schedules, change student schedules, record student absenteeism and student suspensions, and look up student test scores.

In 1990-1991 the Facilities Management department and Mid-Iowa developed a system so that custodians could make facility repair requests through Mid-Iowa. Facilities Management staff review the requests centrally, assign account numbers and costs, and generate work orders. The system improves record keeping and cuts down on the amount of time it takes to get requests from the building to the Facilities Management department.

Networks

Progress is often measured one small step at a time....

Computers are also connected through networks other than telephones. Central office staff started to use microcomputers for word processing by 1983. Before this there were dedicated word processors, but they were operated by specially trained typists. Microcomputers allowed anyone who could touch type--and some that could not--to create and edit documents. Typically, the equipment was a computer, software, and a dot-matrix printer. Other computers were connected to electronic typewriters so that the documents had the typed look instead of the computer printout look produced by dot-matrix printers.

The administrator has a new tool...

By 1985 a new type of computer and printer was also available. The Macintosh was the first microcomputer to allow the user to select and use different typefaces and fonts. When Apple Computer introduced the Laserwriter printer, documents that were created on Macintosh computers and printed on Laserwriters looked very much like typeset output. This change in technology inaugurated a major move to office automation; administrators as well as secretaries typed documents.

There was another major innovation which accompanied the introduction of the Apple Laserwriter. A printer could be connected through special cabling to several computers. At first, departments would purchase microcomputers and a printer for use in the department. Special cables were used to connect the computers and printers. A major change in network technology made it possible to use existing unused telephone wire to connect the computers. Since there was a large amount of unused telephone wire at 1800 Grand because of the new phone switch, one network was constructed to connect all Macintosh computers and Laserwriter printers at the site. In 1989, a computer was dedicated as a file server on the network. A file server allows staff to store and exchange documents electronically. For example, agenda items for school board meetings are now prepared by departments, transferred to the file server, then retrieved by the secretary who prepares the final agenda. This saves retyping each item and allows for electronic storage of each agenda.

Summary

Technology is not new to Des Moines. Teachers and students have learned and benefited from the advances in technology since the late 1950s. The arrival of microcomputers accelerated the pace of integrating technology into mainstream instruction. Microcomputers have also brought changes to "old" technologies such as telephones and video transmission. It would be difficult to list all the uses of technology in the Des Moines schools, but the preceding provides a look at some of the major systems and projects that have been or are in use.

Policies

Coordinating the acquisition and support for technology is an imposing task. In 1984 the Peabody Institute of Vanderbilt University conducted a technology audit of the district. Their report was published in book form and contained a large number of recommendations. One recommendation was that the district form a committee to oversee the purchase and use of technology. The current Technology Committee was organized in response to the recommendation.

The Technology Committee is composed of department directors or their representatives. The committee reviews and approves all hardware and peripheral purchases. The Technology Consultation Committee was formed to assist the Technology Committee. The members are district staff that have a particular expertise in technology. They review each purchase to determine if the request fits with current technology, the ability of the district to support the equipment, and that the requester is purchasing technology that will fit their needs.

The Technology Advisory Committee was formed in 1990-1991. This committee meets three times a year to provide advice to the Technology Committee. Members are drawn from the PTA/PTO, businesses, public agencies, and business partners plus the members of the Technology Committee. A list of the members of the three committees is in Appendix B.

Other guidance comes from the Iowa Department of Education guidelines and professional organizations. Code 280.18 requires

districts to adopt goals and objectives that measure student achievement in technology literacy.

Department of Information Management

A department is created to assist with change

On July 1, 1990, the Information Management Department was formed from the Department of Evaluation, Research, and Testing. The department is part of the Management Services Division. The Director of Information Management is responsible for providing leadership and direction for the district's strategic planning, technology, accountability, program evaluation, research, testing and assessment, and student information operations. The director is assisted by the Coordinator of Technology, a position also created in 1990. This position provides leadership and direction for using technology in teaching, learning and management. Technology is used to support instructional and administrative efforts district-wide.

Input Evaluation

Technology Cost Summary

The district's investment in technology to support learning and administration includes purchasing equipment as well as services. By the end of the 1991-1992 school year the district will have purchased $970,945 in services from Mid-Iowa Computer Center, $1,494,448 worth of computers and peripherals, digital duplicators, and support services (NovaNet, two-way video) for both administrative and instructional needs, and employed technology staff with a total annual salary of $436,951. Media Services supports technology with staff and equipment. Estimated expenditures for the 1991-1992 school year for Media Services staff is $206,350 and for materials, equipment and purchased services is $147,322. The estimated total expenditure for technology for the 1991-1992 school year is $3,256,016. Media Services presented an evaluation report in January 1991, that report detailed the expenditures and services provided by them.

Technology is purchased from many sources.

There are several sources of funds for technology. Parent-Teacher Associations (PTAs) or Organizations (PTOs) sometimes raise money to be used to purchase computers. Departments will budget line items for computers, printers, software, and peripherals. Dollars originally budgeted for one line item may be converted to technology if a pressing need arises during the year. The Department of Information Management budget for technology includes items pertaining to instructional technology projects, two-way video, NovaNet, audio visual repair, and starting in April 1992, computer and office equipment repair. For the purposes of this report most televisions, VCR, and related media equipment are not reported.This information is available in the Media Services Evaluation Report, 1991. In most cases expenditures are related to computers and peripherals, data processing services, and related repair support.

The appropriate line items and amounts budgeted for FY 1992 for the department are shown in Figure 2. These figures exclude personnel costs.

Figure 2
FY 1992 Technology Budgets, Information Management

ITEM	FY 1992 BUDGET	EXPENDITURES[a]
Equipment[b]	$490,250	$481,078
Two-way interactive[c]	91,400	65,014
NovaNet[d]	55,000	32,297
Audio Visual Repair[e]	12,150	14,496
Computer Repair	34,840	43,262
Office Repair[f]	11,340	4,005
Telephone-service[g]	392,533	306,617
Total	**$1,087,513**	**$946,769**

a As of April, 1992; does not include personnel.
b. Includes amounts budgeted for building projects, the East High School lab, district contribution to Roosevelt computer lab, digital duplicators, and the staff development lab.
c Includes a service fee to US West and classroom equipment.
d. Includes service fee to University Communications Inc. for NovaNet services, equipment, and supplies.
e. Pays for all audio visual repairs, does not include maintenance agreements
f. This includes several sub accounts that allocate money for elementary, middle, and high school office repair, and maintenance.
g. Includes all telephone service for the district, long distance charges for central office, fiber optic service fees.

Additional budgets with line items for technology include Des Moines Plan and the districts services account for Mid-Iowa.

Figure 3
Mid-Iowa Computer Center Budgets and Expenditures

Item	Fiscal Year 1992 budget	Expenditures
Mid-Iowa Services	$550,651[a]	$412,988
Heartland AEA Contribution	244,444[b]	183,333
Mid-Iowa Time and Mat.	130,850[c]	100,000
Total to Mid-Iowa	**$925,945**	**$696,321**
Mid-Iowa Services provided for lease	45,000[d]	33,750
Total services used	**$970,945**	**$730,071**

Payments are paid on a quarterly basis except for time and material charges; does not include personnel.

a This includes basic services that are in addition to those covered by Heartland AEA's Educational Services. This does not include time and material charges to any department needing additional services.
b Heartland AEA contributes this amount as a part of their commitment to provide basic services to AEA 11 districts.
c Information Management, Des Moines Plan, Food Service, Child Care, Facility Management, and other departments pay for unique services.
d Mid-Iowa reimburses the district for the lease of their facilities by providing data processing services that include supply requisition system, textbook inventory, lunchroom accounting, investment analyses, special address labels.

In addition to the budget line items, technology is purchased from funds provided by parent organizations, business partners, special allocations — special education, Gifted and Talented, and Des Moines Plan — and fund raisers. The following shows fiscal years 1990-1991 and 1991-1992.

Figure 4
Two Year Expenditures for Technology

Level	Fiscal Year 1991	Fiscal Year 1992[a]
Central Office[b]	**$137,659**	**$174,659**
Elementary Schools		
Building funds	30,500	7,967
PTA/PTO	24,851	11,762
Other funds	5,129	53,699
	60,480	**73,428**
Middle Schools		
Building funds	40,232	4,258
PTA/PTO	0	24,332
	40,232	**28,590**
High Schools		
Building funds	37,829	45,905
Other funds	27,258	84,350
	65,087	**130,255**
Total	**$303,459**	**$406,932**

a Fiscal Year 1992 figures are as of April 15, 1992 and based on requests received by the Technology Committee. Additional expenditures are expected before the end of the fiscal year.

b Some of the central office expenditures placed computers in the the schools. Most of the computers are used for administrative support, but some equipment was placed in the classrooms, e.g., special education, New Horizons, Des Moines Plan.

The next three graphs show the percentage of elementary funds that were expended in fiscal years 1991 and 1992 — as of April 15, 1992 — on technology according to the source of funds. Building funds are dollars allocated to budget line items and used to purchase equipment. Fund raisers by students and lab fees are considered building funds. "Other funds" include special education, Gifted and Talented Program, Des Moines Plan, and donations from business or others.

Figure 5

Elementary Expenditures by Source, FY 91

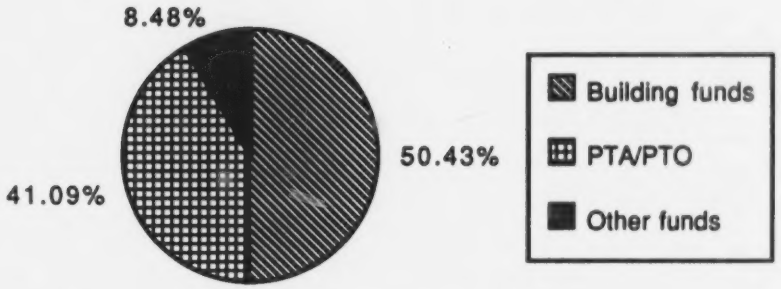
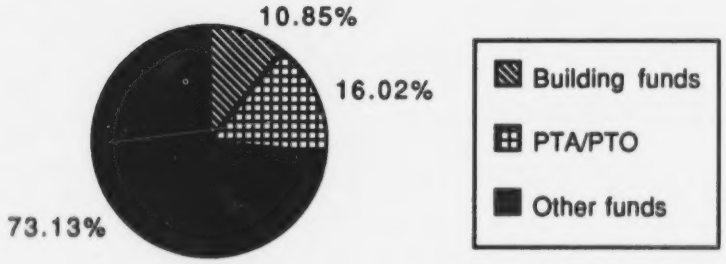


Figure 6

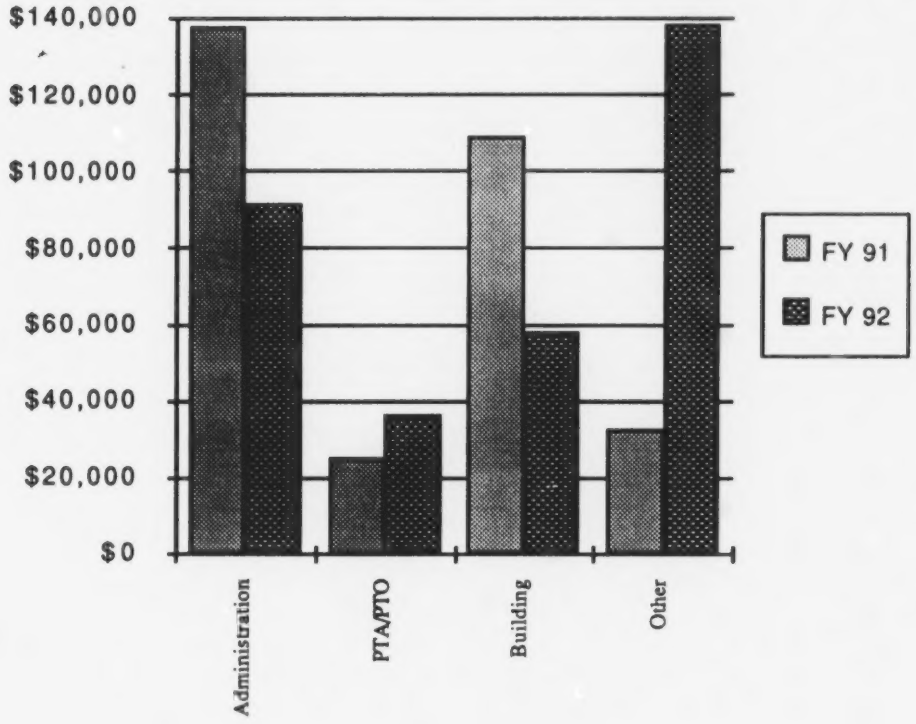
Elementary Expenditures by Source, FY 92



The next graph shows the amount of expenditures for technology by fiscal year and source of funding.

Figure 7

Expenditures by Year and Source



Inventory

How many computers are there?

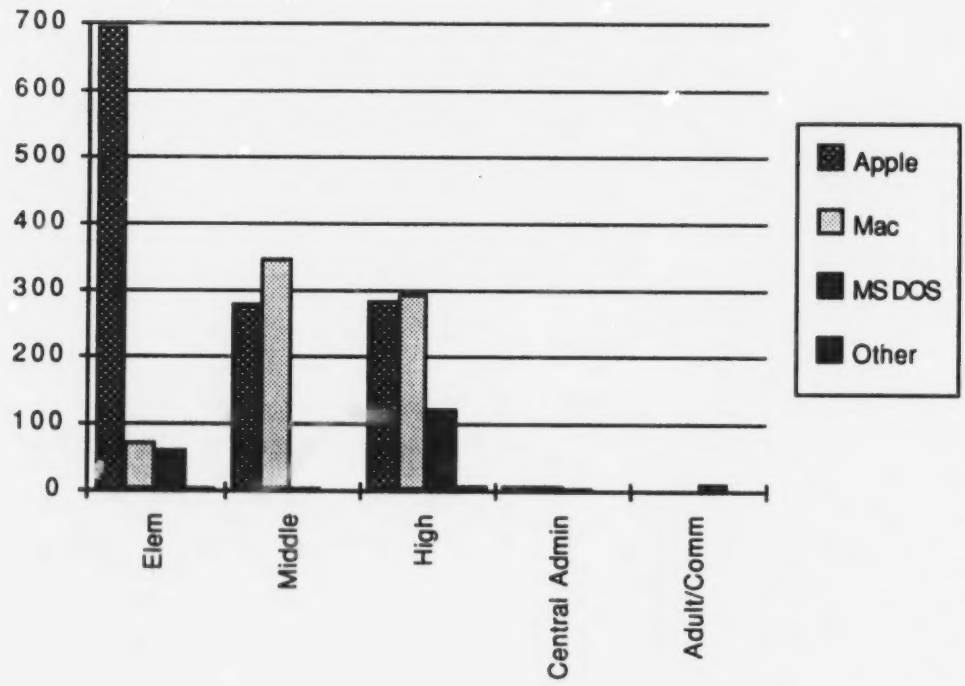
The number of computers used by district staff changes weekly. An inventory is maintained of computers and computer related equipment such as printers, external hard drives, the amount of memory the computer has and whether the computer is used for instruction or administrative purposes. Instructional use is defined to be anytime the computer is used by students or teachers. Administrative use is defined to be anytime the computer is used by office staff, e.g. principals, secretaries, or attendance staff.

As of May 1, 1992, there were 2,686 computers being used in the district. Of these, about 80% are used for instruction and the balance for administrative purposes. The ratio of students to computers for elementary is 19:1. The ratio of students per computer is 11:1 at the middle high schools and also 11:1 at the high schools.

The next two charts show the number of different styles of computers that are used for instruction and administration by level. Apple computers are Apple //e, Apple ||, Apple //c, and Apple IIGS. Mac refers to any of the Apple Macintosh line of computers. MS DOS refers to IBM or IBM compatible computers. The district also has a small number of Radio Shack, Texas Instrument, and other non-standard computers.

Figure 8

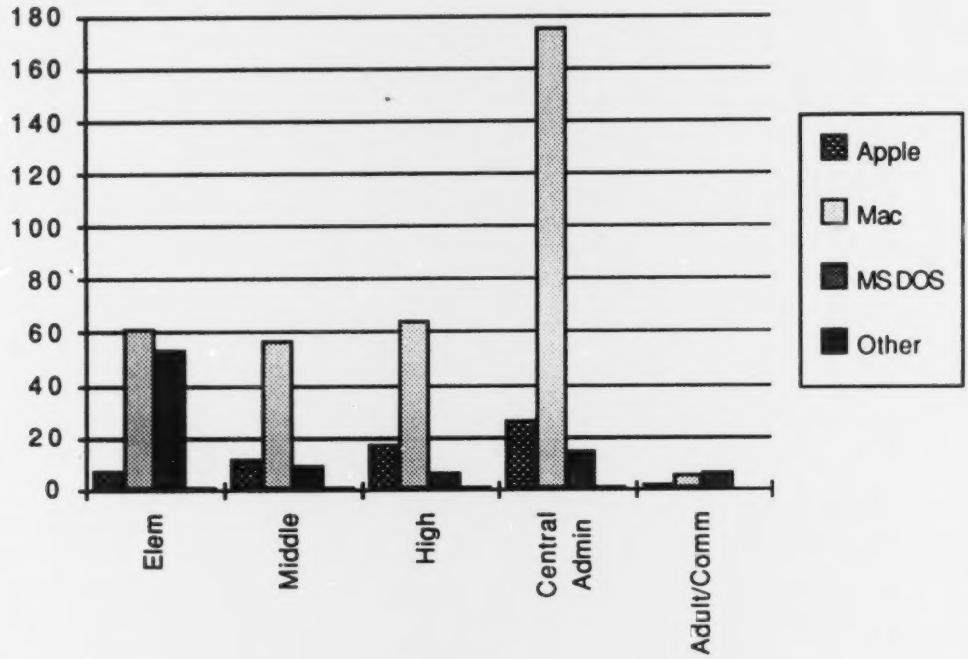
Number of Computers Used for Instruction



Data as of May 1, 1992

Figure 9

Number of Computers Used for Administration



Data as of May 1, 1992

Telecommunications

Telecommunications equipment include telephones, computers that emulate terminals to Mid-Iowa Computer Center, and networks that connect microcomputers. The following indicate the approximate number of telephones, terminals (or computers emulating terminals, networks with file-servers as of April 1992.

Telephones	
900	Elementary School
300	Middle School
360	High School
495	Central Campus/Administration
27	Cowles
24	Samuelson
2106	Total

Mid-Iowa Administrative Data Network

120 Elementary School Data Terminals
70 Middle School Data Terminals
75 High School Data Terminals
39 Administration Data Terminals

Instructional Computer Networks with file-servers
2 High School(Netware and Appletalk
3 Elementary School
3 NovaNet labs

Administrative Macintosh Computer Network
5 High School - 5 to 10 computers per building
2 Middle School - 3 to 5 computers per building
2 Administration Offices - 125 computers, printers

Staff Support

The supporting cast

The technology staff in the Department of Information and Management have several roles. Planning and coordination, instructional technology support, telecommunications, computer repair, office equipment repair, and audio-visual repair. Figure 10 lists the staff and 1991-1992 salary.

Figure 10

Personnel Resources

TITLE	F.T.E.	SALARY ($)
Director of Information Management	0.5	28,008
Coordinator of Technology	1.0	43,834
Telecommunications Consultant	1.0	40,037
Telecommunications Specialist	2.0	66,310
Telephone Technician	1.0	19,781
Instructional Technology Specialist	1.0	38,177
Technology Specialist	0.5[a]	16,282
AV Repair and Maintenance Manager	1.0	36,899
AV Repair Technician	2.5[b]	60,230
Computer Repair Technician	2.0[c]	38,502
Office Repair Technician	2.0[c]	41,891
Intern	0.5	7,000
TOTAL	15.0	$436,951

[a] The Director of Information Management and Technology Specialist are full-time equivalent positions who also work in the area of Evaluation, Research, and Planning. Only one-half of their salaries are included in the total.

[b] One of the AV repair technicians is a full-time position who also works half-time as a Technology Education teacher at Central Campus. Only one-half of the salary is included in the total.

[c] These positions were transferred to Department of Information Management in April 1992.

Cost of In-service — Staff Development

Department of Information Management professional staff attend the Des Moines Public Schools Professional Educators Day annually. In addition, staff members attend various in-district staff development classes for learning new skills and applications. Some specialized training includes maintenance on ROLM telephone switches, working with hazardous materials, computer repair, and curriculum development work shops, network training, and laserdisk development.

Staff members of the Department of Information Management maintain professional memberships in various national and state organizations. Attendance at national or state meetings of these organizations is not only beneficial for the purpose of receiving training and information on state of art methods, but have afforded staff an opportunity to deliver presentations and publicize activities occurring within the Des Moines district. Additional information on participation in professional organizations may be found in the "Process" section of this report.

Materials in Use by the Department that relate to Technology

- software: Microsoft Word (Mac and MS-DOS versions), Microsoft Works (Mac and MS-DOS versions) Filemaker Pro, Microsoft Excel, 4th Dimension, MacProject, Aldus Persuasion, More (for presentations), SPSS (mainframe and microcomputer versions), Microphone II (communications software), White Knight (communications software), PC-File (MS-DOS data base), MacBridge (terminal emulation for Macintosh computers), The Perfect Mate (terminal emulation for MS-DOS computers to Mid-Iowa), MacDraw Pro, Cricket Graph, HyperCard,File XPress, various CD-ROMs, laserdisks.

Equipment in Use by the Department

- Macintosh, Apple //e, IBM and other MS-DOS computers
- printers
- scanners (mark recognition)
- scanners (graphics and text)
- test equipment for TVs and VCRs
- test equipment for ROLM switch
- appropriate tools for splicing cable, installation of cable
- two way radios
- CD-ROM, Laser disc player, CD-I player

Process Evaluation

Technology Planning

The Des Moines Independent Community School Board of Directors directed staff to prepare a long range comprehensive technology plan. District staff prepared the plan following a sequence of steps.

1. A needs assessment was conducted in 1990. Each department and school identified their two- and five-year goals or objectives for using technology. The goals were collected at meetings during November and December 1990, in which the goals were discussed and clarified. Additional needs were identified from research literature, National School Board Association, National Council of Mathematics Teachers, National Education Associations, International Society for Technology Educators, and National Council of Science Teachers, recommendations from the Iowa Department of Education, and a review of technology plans from other districts across the nation.

Identifying Needs

2. The goals and objectives from the schools, departments, and external standards were condensed into technology objectives and solutions for the objectives. These objectives were grouped according to elementary, middle and high schools, and administrative or central office departments. Additional committee work identified critical procedures necessary to implement the plan. The District Technology Committee, Technology Advisory Committee, and the Strategic Planning Committee reviewed draft forms of the plan. Each of the committees suggested revisions to broaden the scope of the plan or to provide additional detail.

Technology Objectives and Solutions

3. During this time, an inventory of all computers and peripherals has been maintained so that it is possible to have a general idea of the number of computers and how they are being used at any moment.

Current inventory

4. The constant changes in curriculum and technology require continual monitoring of new technologies. The plan will be periodically reviewed and evaluated by principals, teachers, other administrators, clerical staff, Mid-Iowa Computer Center staff, Heartland Area Education Agency staff, and community stakeholders.

periodic review

5. All technology staff and staff from other departments compose the Technology Consultation committee. They review each purchase to determine if the request fits with current technology, the ability of the district to support the equipment, and that the requester is purchasing technology that will fit their needs. This committee also meets on an "as need" basis to share information on current technology. The committee also discusses and agrees on hardware configurations that are recommended to staff for purchasing.

planning hardware configurations

Technology Purchases

Computers

Purchasing process

The process for purchasing computer and related technologies goes through several steps to ensure that purchases match the need and the district can provide support and repair. The first step involves the Technology Consultation Committee. These are district staff that have expertise and positions where they can provide technical advice on the most appropriate hardware and software. They consult with the the staff and make recommendations that will meet their needs and fit within the overall planning of the district.

The next step is to gain approval by the District Technology Committee. Each purchase is reviewed by the committee. Once the purchase has been approved the request goes to the Purchasing Department for processing. When the items are delivered to the district, the computer repair technicians mark and tag hardware for inventory and security. The equipment is then delivered and installed at the appropriate site. The inventory information is recorded in a data base maintained in the Department of Information Management. Each department and building is responsible for arranging training or inservice if needed.

Telecommunications

If a teacher or department needs an additional telephone, the request is made through the building principal or department head to the appropriate director. If a building does not have telephones in each room then the principal and staff have to decide how to reallocate existing telephone resources. If the expense of providing the new service or telephone is to do some wiring and place a phone set then it is usually done. Jobs that require several work hours and expense are reviewed by the Telecommunications Committee and a decision is to made to fund or return the request

Need a new phone? Call us....

The district has a goal of providing a telephone in every teacher's classroom. This is part of the School Improvement Bond levy. The goal is to have this completed during the 1995 school year. A second goal for telecommunications is to connect as many schools to the main telephone switch as it become economically feasible.

A phone for every teacher...

Consultation Assistance

Each of the technology positions has a role in assisting and advising district staff on the most appropriate technology that best fits district needs. Often, defining need is the first step in the process. The second step is determining that the financial resources are available to purchase the technology.

We help you to decide.

Other considerations that influence recommendations include: availability of training or inservice support, cost of repair and maintenance, fills a need within building improvement plan, and in keeping with the district's technology plan, and maintaining some degree of consistency. Exception can be made to one or more of these considerations, but priority is given to fulfilling needs that are based on improvement plans or goals.

Technology Repair and Support

Service to the customer is the only rule.

Telephone, computer, and office equipment repair are all handled in the same way. When equipment does not work, trouble calls are reported to the main reception desk at 1800 Grand. Information is recorded on appropriate repair orders. The repair technicians collect the information and deal with repairs as quickly as possible using a "first call first response" pattern when possible. Since most calls require going to the site, the technicians usually deal with one section of the district at a time.

Audio-visual repair is located at the district's Transportation and Food Service Facility. Repair calls go directly to the repair shop or the item is delivered through a regular delivery system. When items are too large to be delivered this way, one of the repair technicians will go to the building to repair the item or to transport it back to the shop.

Mid-Iowa Computer Center

Mid-Iowa Computer Center Committees

Mid-Iowa's services are not formally reviewed by the district. There have been several studies sponsored by Heartland AEA since 1984 with the last one in 1988. Many of the current committees and governance structures are a result of these studies. A member of the Board of Directors and the Director of Information Management are members of the Mid-Iowa Board of Directors. The Director of Information Management also represents the superintendent on the New Services Committee and is a member of Heartlands Data Processing Committee Advisory Committee. Several other district staff are members of various services committees that provide advice to Mid-Iowa on pupil accounting, personnel, payroll, and financial accounting services.

Technology plan

When the the district's technology plan was discussed by the Board of Directors questions were raised about the district's need to continue to use Mid-Iowa's services. A study that would be comprehensive enough to determine that is beyond the scope of this report. However, some user data could be collected to determine the general level of satisfaction with Mid-Iowa services. A survey was developed to determine basic user satisfaction with services that Mid-Iowa provides. A copy of the survey and a full report is available in the Department of Information Management. A summary of the results is in the "product section."

Current Year Goals

The following goals in the 1991-1992 District Improvement Plan relate to the district's technology efforts.

Goal 18 Develop specific plans for using technology

- develop a long range plan for technology in the district
- assist buildings in the implementation of their technology plans

Goal 19 Implement specific technology initiatives

- provide additional equipment and orientation for bringing technology for teaching and learning into the classrooms
- bring all high school counselors on-line with Mid-Iowa Computer Center
- continue to replace purple spirit duplicators throughout the district
- initiate model demonstration program which support instruction with technology

Responsibility Statement, Coordinator of Technology

Coordinator of Technology

The responsibility of the Coordinator of Technology of the the Des Moines Independent Community Schools is to provide leadership and direction for the district's use of technology in teaching, learning, and management.

Some organizational tasks to be performed include coordinating the district's instructional and administrative technology initiatives and interacting with other district staff, the community, the media, and state and national organizations, to carry out the mission of the district.

The Coordinator of Technology reports to the Director of Information Management and serves as a member of the Technology Advisory Committee, Technology Committee, and the Technology Consultation Committee. He directly supervises the Telecommunications Consultant, Instructional Technology Specialist, Manager of Audio Visual Repair, two computer repair technicians, two office equipment repair technicians, Technology Intern, and the Technology Specialist.

Telecommunication Consultant

The Telecommunication Consultant is responsible for coordinating the district's efforts with telephone, networks and related technologies. He is assigned to the following activities:

- supervision of the communications and telephone technicians
- member of Telecommunications committee
- member of Technology Consultation Committee
- direct operations for telephone/telecommunications system
- provide or arrange for training on telecommunications systems
- plan and implement expansion of telecommunications installations
- plan and implement fiber optic installations
- plan and implement 2-way video use
- provide linkage with State Communications Division on state network and other projects
- development and structuring of Local Area Networks(LANS)
- provide linkage with city and county telecommunications projects

Instructional Technology Specialist

The Instructional Technology Specialist is responsible for coordinating the district effort to expand use of the two-way video systems, NovaNet systems, cable services, and adaptive devices. The position reports to the Coordinator of Technology and works with the Telecommunications Consultant and the Technology Specialist on facilitating use of technology in the classroom. He is assigned to the following activities in

Two-way video:

- train new instructors on two-way equipment and use
- provide technical and instructional support on two-way video to teachers
- develop programming on the system
- coordinate visitor to the system
- coordinate staff development courses on the system
- provide, and sometimes, install, equipment at sites
- identify equipment for use in classrooms
- collect information for two-way schedule
- write bid specifications for TV, VCR, CD-ROM, laserdisc, etc., equipment

NovaNet: handles trouble calls, replaces equipment,

- assist in expansion and variety of system use
- data collection on use Cable vision:
- install interfaces on computers used to draw off CNN news service
- provide liaison with Heritage Cable Service
- assist in production of staff development programming on cable channel
- promote use of cable Channel 21 for instructional use
- train and assist librarians and library associates to use VCR and cable services

Technology Specialist

The Technology Specialist reports to the Program Evaluator: Evaluation, Surveys, and Planning half time and the Coordinator of Technology half time. Her technology responsibilities include:

- technology planning,
- satellite program planning/coordination,
- investigating and recommending instructional software
- identification of a document retrieval system.
- member of Technology Consultation Committee

Manager of audio-visual repair

Computer repair technicians

The Manager of audio-visual repair supervises the audio visual repair operations and two audio visual repair technicians. There is a half time repair technician that also teaches electronics at Central Campus.

The two computer repair technicians responsibilities include the installation, maintenance and repair of all computers, printers, and computer peripherals in the district. The two office repair technicians are responsible for the installation, maintenance, and repair of typewriters, spirit duplicators, and other electrical based office equipment. The computer and office repair technicians were transferred to the Department of Information Management in April 1992.

Organizations to which various Department of Information Management technology staff belong:

- American Educational Research Association (AERA)
- International Society for Technology Educators (ISTE)
- American Home Economics Association (AHEA)
- National School Boards Association Institute for the Transfer of Technology in Education (district membership)
- Association for Educational Communication and Technologies (AECT)
- Information Processing Executives for Large School Systems (IPALLS)
- Iowa Computer Using Educators (ICUE)
- Iowa Educational Research and Evaluation Association (IEREA)
- Iowa Association for Supervision and Curriculum Development (IASCD)
- Iowa Educational Media Association (IEMA)
- Iowa Telephone Users group
- ROLM Users Group
- Association of Public Safety Telecommunications
- Drake University College of Education Technology Task Force
- Iowa "No Name " Evaluators (an unofficial group of persons in Iowa engaged in program evaluation, research, and testing activities)
- Golden Circle Technology Group (an unofficial group of persons in central Iowa that have technology coordinator or specialist roles. They meet bimonthly to share information and experiences with implementing technology in public school settings)

Examples of professional meetings and workshops recently attended include:

- National School Boards Technology and Learning Conference, 1990, 1991 *
- Association for Educational Curriculum Technologies, , 1992 Annual Conference
- Iowa Curriculum and Instruction Conference, 1991*
- Iowa No-name Evaluators conference, 1991*
- Iowa Computer Using Educators (ICUE)) annual conference, 1991*
- Iowa Educational Research and Evaluation Association (IEREA), 1991
- Distance Education Workshop, Madison, Wisconsin, August, 1991.
- Nebraska Interactive Media Symposium, May, 1991
- Association for Supervision and Curriculum Development, Annual Conference, 1991
- North Tama Technology Symposium, March, 1991, 1992
- TeleCon ,10, 11 : telecommunications conference Nov 1990,1991
- INFOCOMM: the exposition of video,computer, A/V, presentation and Multimedia communications industry February, 1990

- Assignment Discovery Workshop March 1992 *
- Heartland Media Fair Oct. 1990 *
- Iowa State media fair 1991, 1992 *
- District Inservice 1992 *
- Iowa Media Educators Association 1992*

*Presentation made

The Coordinator of Technology meets with the staff on an ad hoc basis to discuss plans, ideas, and activities. The coordinator, consultant, and specialists meet with the rest of the Information Management Department monthly for the purpose of discussing and reviewing current and future projects, activities, etc. The coordinator also attends the subject area supervisors meeting.

PRODUCT SECTION

Technology Planning

Technology Plan

The Department of Information Management has responsibility for developing specific plans for using technology for the district and for assisting buildings in the implementation of their technology plans

A draft copy of the district's long range comprehensive technology plan was presented to the Board of Directors for discussion in April 1992. Their questions and discussion indicated that revisions to the plan were needed to address some of the Directors' concerns. The Directors also indicated that the plan should be presented to them after this report is presented and discussed by the Board of Directors..

Building Plans

Each middle and high school developed long range building plans that reflected building improvement plans and guidelines outlined in the draft version of the comprehensive technology plan. The plans were reviewed by staff in the Information Management Department and are on file in the Department of Information Management.

The elementary level technology plan is to finish installing digital duplicators in each elementary school and to use 1992-1993 technology funds to supplement existing programs. Their plan also includes the development of a K-5 Integration of Technology Plan that will determine the software elementary schools are to use.

Some of the technology support that the Department of Information Management provides are ways to implement specific technology initiatives. The first part of the objective is to provide additional equipment and orientation for bringing technology for teaching and learning into the classrooms. An equipment account was budgeted for the 1991-1992 school year to provide funds for instructional technology and is shown in the Input Evaluation section of this report.

Teachers know what they want to do...

Building staff wrote proposals on how they would implement technology in the classroom during 1991-1992. Over fifty proposals were received and twelve projects were funded. Copies of the proposals are available in the Department of Information Management . A brief summary of the projects and the grant award follows:

- Jackson Elementary School. Eight teacher work stations to aid in teaching math, science, health, language arts, reading, music and art. Grant: $44,000
- Findley Elementary School. Six teacher work stations that can be used individually for teacher presentations and grouped for student use in a lab setting. Grant: $30,366.
- Madison Elementary School. Subscription and equipment for National Geographic Kids Network. Grant: $3,700.
- Hoover High School. Equipment and subscription to Minitel Service — on-line communication system in the French language. Grant: $4,022.
- Oak Park Elementary School. Teaching station. Grant: $3,209.
- Longfellow Elementary School. Whole class computer instruction. Grant: $2,171.
- Smouse Elementary School. Adaptive devices to allow limited mobility students to use computers. Grant: $7,792.
- Van Meter School. Adaptive devices to allow limited mobility students to use computers. Grant: $3,031.
- Goodrell Middle School. Electronic reference systems for library uses. Grant: $3,210.
- Wright Elementary School. Interactive video systems for student learning. Grant: $36,143.
- Roosevelt High School. Instructional computer lab for cross discipline learning, Twenty computers. Grant: $34,975.
- Merrill Middle School. Twenty teacher stations. Grant: $35,000.

Additional expenditures from the equipment account include:

- Development of a staff development computer lab at Samuelson school. The lab contains eight computers on a network so that staff can learn various software with equipment similar to the computers they use in the schools.
- A mathematics lab with 28 computers at East High School for about $78,000.
- One televisions and VCR for each elementary school to record and playback educational programs offered through cable service. This was a $43,000 expenditure.

Matching grants

The district provided $20,000 to match an equal amount donated by Upper Iowa University to replace twenty computers at Roosevelt High School. The computers are used during the day by Roosevelt students to gain computer tool skills and by Upper Iowa and Adult, Community and Continuing Education programs in the evening.

Counselors control their information

A second goal was to bring all high school counselors on-line with Mid-Iowa Computer Center by the end of the year. Most of the high school counselors and two middle school counselors were provided computers, printers, software, training, and connections to Mid-Iowa Computer center during the 1990-1991 school year. The balance of counselors were provided with the same system by December 1991. Now all middle and high school counselors can look at individual student information, establish class schedules, and change or add student schedules. Being able to make changes on-line saves counselors time since all changes take effect immediately and new schedules are available when the change is made. Also, many of the counselors have increased their written communications since they can do much of it without secretarial assistance.

Get out of the purple business

A third goal was to continue replacing purple spirit duplicators throughout the district with blackline duplication equipment. Seventeen elementary schools received digital duplicators by mid September 1992. There are twenty-three elementary schools that do not have blackline duplication equipment The duplicators replace spirit duplicators that produce purple copies.

Ideas grow...

A fourth goal was to initiate model demonstration programs which support instruction with technology. Many ideas on how to use technology in the classroom come from staff in the buildings. The department assists staff in working through all the decisions that have to occur before an idea is put into action.

Text for computers

The department provided advise on computers and other equipment to the eleventh grade English teachers when they choose to use textbook funds to purchase technology to teach with instead of providing texts for every student. The textbook that they recommended for eleventh grade English included software that teachers could use to demonstrate the writing process. Their plan is to use computers, display panels, and software to demonstrate writing process in class and students would then use computers in labs or the library to write their assignments. This is the first time that textbook money has been used to purchase technology in this manner. But, the project provides a model for other curriculum areas to follow.

Laptops for elementary students

Perkins Elementary School purchased fifteen laptop computers for student use in Language Arts class. Students use the computers to compose, edit, and produce printed work. The laptops allow the computers to come to the students instead of students going to computer labs. This project is being used as a model for Moulton Elementary School as they develop a writing lab in 1992-1993.

Two-way video is a means, not an end.

The department coordinated the use of two-way video to provide illustration to students that would be denied the course because a teacher was not available to teach the class. This technology has been used to teach foreign language for three years. During the 1991-1992 school year, Lincoln, Roosevelt, North, and Urbandale conducted Latin, Japanese, and Chinese classes between one or more schools. In addition students at North High School took Current Issues from a teacher at Roosevelt and Talented and Gifted programs in four high schools are getting together for a brown bag lunch. Debate classes are exchanging techniques throughout the system.

During the fall 1991 semester, there was a pilot project that connected Iowa State University and Central Campus with a two-way video system. Four graduate courses were conducted in the evening hours while Central Academy students participated during the day in seminars and lectures from Iowa State professors. The pilot project proved to be successful and Iowa State is preparing to provide a two-way video link during the 1992-1993 school year on a permanent basis. The project also provides a model for the district and Iowa State University for planning use of the Iowa Communications Network.

Phone messaging is a new tool

The district's Phonemail system was used to pilot two projects. The first was to have a central information center for staff vacancies. Starting in the summer of 1991, teachers called a number and through a series of menu options activated by a touch-tone can hear current staff vacancies. The information is current, accessible to staff from home or work, and printing costs are reduced.

A second Phonemail project provided a homework information system. Each teacher at Callanan Middle School was assigned an extension number. Teachers are able to record homework messages by calling a number, keying their extension, entering a password, and then recording one or more messages. This can be done from school or

home, all the teacher needs is a touch-tone telephone. When parents want homework information they call one main number and then the teachers extension — provided along with instruction on the process — to listen to the teacher's message. The school principal or secretary can can also record a general message such as "there will be a pep assembly on Friday." The pilot has been successful and will be offered to the other schools. Using Phonemail for this application will save the district money. Many of the middle and high schools were ready to purchase a microcomputer-software system that would allow staff to record messages for parents. Each system is about $10,000 to purchase and install. Since Phonemail already exists needs to be upgraded, about half of the money that the schools were about to use to purchase a messaging service will increase the central phonemail system so that all schools in the district can use the service. It will be more cost effective to provide service and support if one system can do it.

Inventory

An inventory of computers, printers, external hard drives, and other peripherals is maintained in the Department of Information Management. The inventory as of May 1, 1992, is reported in the Input Evaluation section of this report. Detailed information can be obtained from the Department of Information Management.

Telephone and Networks

Teachers can call parents

The Department of Information Management is responsible for installing and maintaining telephone service to the district. There is a goal to install a telephone in each classroom by 1995. Also, phone service is provided to buildings through fiber optic cable where it is economically feasible.

By April 1992, twenty-four elementary schools, two middle school, and three high schools have telephones in each room and existing intercom systems have been replaced. In addition, three elementary schools, two middle schools, the bus and food service building, and four high schools are served by fiber optic cable. Existing

phones have been replaced and additional phones added. A complete list of schools that have new phones and those remaining on the list is available in the Department of Information Management.

The same team that installs phone systems also maintains existing equipment. Trouble calls are handled often the same day they are reported or at the very least the next day. The number of service calls that have been recorded since July 1991 are:

783	Telephone
124	Computer Network
49	Miscellaneous (PA, Security, Radio, Nova Net, etc.)

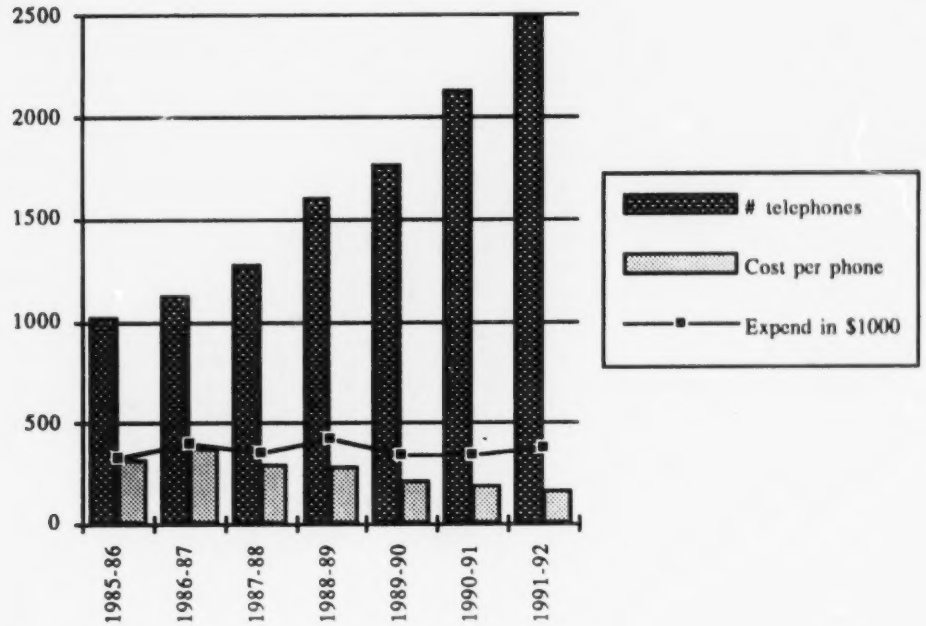
Buying and installing telephone equipment using district staff has proven to be an efficient and effective process. One objective of replacing rented equipment with purchased systems was to provide increased service for the same or less expenditures.

It pays to do it yourself sometimes

Figure 11 shows how the number of telephones have increased, annual expenditures on phone service has stayed fairly constant, and the annual cost per phone has decreased. The district's telephone system is providing a cost effective service that holds actual expenditures constant and increases services to district staff. It is feasible, effective and efficient to put telephones in every classroom without greatly increasing expenditures.

Figure 11

Number of Telephones, Annual Cost per Phone,
and Annual Expenditures



Networks

An electronic mail system was established during the 1991-1992 school year on the computer network located at the Board of Education offices. This system allows staff to send documents and memos from computer to computer. The recipient is notified when they have mail. The sender can get a receipt to indicate the mail has been received. Multiple addressees can be assigned to memos.

Starting in the fall of 1992, building staff will be trained on how to connect their computers to the electronic mail system using a telephone modem. By spring 1992, all buildings will be able to send and receive electronic messages for staff at other buildings or at 1800 Grand.

Consultation Assistance

Helping others help kids

The technology staff provides assistance to district staff in several areas of technology. The following are some of the areas of assistance that were provided by April 1992.

Classroom teachers

- install telephones in classroom
- install telephone connections for computers
- assist with installing ISU-Pioneer science project
- install telephone and recommend National Geographic Kids Net
- recommend devices with computers for Hearing Impaired
- assist with purchase of Sensory Handicapped/Story Boards
- explore and recommend CD-I innovations
- install and train for the use of X-Press
- recommend CD Rom
- recommend Laser disk
- recommend, install, and support Networks
- suggestions on how to use Television
- recommend and demonstrate music CD players
- recommend, install and support music computer-keyboard systems
- recommend software
- assist with grant writing
- recommend and support 11th grade English teachers

Counselors

- place computes on each counselor's desk
- connect computers to Mid-Iowa for on-line processing
- replacement equipment for Career Information System
-

Food Service

- point of sale system
- connection to Mid-Iowa
- work station support

Facility Management

- security system
- maintenance management system
- utility usage data
-

Transportation

- EDULOG
- communications network
- equipment upgrades
- service and support

Adult education

- automated registration system
- computer purchase for adult training lab
-

Assist other districts with X-Press

- Grimes, Drake, Ankeny, Urbandale
-

Library/Media Services
- electronic reference systems
- automated library systems
- Staff Development
- Selection of presentation equipment and set-up
- Staff development lab equipment and furniture

Areas of technology that affect the district

Technology planning
- needs assessment
- meetings on needs
- plan development
- approval process
-

Technology grants
- consulted with building staff on plans
- coordinated purchase and delivery
-

Inservice day
- Audio-visual support
- Technology Play Room was coordinated and staffed
-

Radio system
- work with county and city officials on Metro radio system

Cable system
- Install/Coordination
- CNN News
- File Xpress

Specifications for AV equipment
- VCR
- TV
- develop presentation
- identify and purchase equipment
-

Two-way video
- coordinate classes on system
- support teachers that use system
- identify and purchase equipment
- ISU compressed video system
-

Electronic mail
- electronic mail in central office
- dial in electronic mail from buildings
- consult with Heartland AEA on computer network
-

Telephone systems
- telephone in classrooms at seven schools
- consult with state on state network

- consult with AEA 11 on telephone system
- connect major campuses - high schools - to local switch
- job information line
- homework information pilot at Callanan
- attendance calling systems
- answering machines
- substitute calling system

Instructional Management System

IMS Plus

During the 1991-1992 school year Information Management staff assisted the Supervisor of Mathematics and other staff with installing IMS Plus in fifteen elementary schools. This brings the number of elementary schools that are using a computer based instructional management system to twenty-two.

Installation of IMS Plus is contingent on replacing MS-DOS based computers at the elementary schools with models that are faster and have greater capacity. Also, dot matrix printers that are four or five years old were replaced with ink-jet printers. The new printers provide a high quality print and are much quieter.

The replaced computers are used to provide repair parts for like model computers still in the schools.

Mid-Iowa Computer Center

Survey on satisfaction

A survey was developed to get a general sense of user satisfaction of the services provided by Mid-Iowa Computer Center. The survey was distributed to about 300 staff who have on-line activities, e.g, counselors, secretaries, or use information produced by Mid-Iowa. Forty-nine percent of the surveys were returned. Respondents included attendance clerks, secretaries, principals, custodians, counselors, testing specialists, and "other". The survey asked if for the average amount of time delay between entering their usercode and password and when they could start to use pupil accounting — or other application. They were also asked for their satisfaction with: budget development, plant-maintenance work orders, change student information, new pupils, pupil attendance, student scheduling, suspensions,test file upload — tests are scanned and data transferred to Mid-Iowa through an "upload" — and test score lookups.

Of the on-line users that responded, 77.5 % indicated that it took on the average less than a minute to get a session after entering their usercode. Most indicated that it took between 30 seconds and a minute.

The satisfaction level with on-line services was measured on a scale of 5 being very satisfied and 1 being very dissatisfied. The highest rating of satisfaction was with the budget development system, elementary staff rated that with an average rating of 4.6. The lowest rating was high school staff rating uploading test data and doing a test lookup of test data with a 3.0. When elementary and middle school respondents are included, uploading test data had an average rating of 3.5 and looking up test scores had an average rating of 3.8.

The survey was not comprehensive and did not explore if users had a basis of comparison to determine if the level of service they received from Mid-Iowa was as desired. A complete report of the survey will be available in the Department of Information Management.

FUTURE PLANNING

Technology Planning

Much of the Department of Information activities for next five years will be determined by the district's Comprehensive Technology Plan. On June 24 and 25 a compressed planning conference will be conducted to address several technology planning issues raised by the Board of Directors. The goal of the conference is to affirm the district's vision of how technology will help students to learn, and set technology priorities, and provide a common vocabulary for technology.

The second step in adopting the district's technology plan is to go through a process that will result in an external validation of the plan. The validation should answer the following questions: 1) have the needs of the district been identified, 2) does the Comprehensive Technology Plan address the needs of the district , and 3) is the scope of the plan sufficient? The agency or individuals who will conduct the validation will be identified through a Request For Proposal (RFP). The RFP will be developed by a task force of district and non-district representatives. Potential members of the RFP Development Task Force are representatives from the District's Technology Advisory Committee, the Board of Directors, and Heartland Area Education Agency. The task force will review the RFPs and the results of the external validation. It is estimated that this process will have a budget impact of $25,000.

Building technology plans should be reviewed annually to reflect changes in the building improvement plans and the district's technology plan. Staff from the Department of Information Management will assist in the process.

The district, Heartland Area Education Agency, Mid-Iowa Computer Center, and the State of Iowa need to meet regularly to coordinate technology plans. This is a goal for the 1992-1993 district improvement plan.

The district should explore if a detailed evaluation of services provided by Mid-Iowa Computer is needed. If so, then a process should be identified that results in an evaluation of the services provided by Mid-Iowa. Some of the evaluation goals would include determining if Mid-Iowa meets the needs of district staff, if alternative methods of

delivery are more cost effective, and if the district should continue with its relationship with Heartland AEA and Mid-Iowa Computer Center.

Technology Purchases

The process for purchasing technology needs to be reviewed annually. The current process has served the district well, but as technology changes the process for approval may need to change. The Department of Information Management will continue to evaluate the process and make recommendations to the Technology Committee.

Telecommunications

The department will continue to install telephones in classrooms with a goal of having a telephone in every classroom by the close of 1995. The fiber optic network will be expanded to include the Smouse/Callanan/ Van Meter complex during 1993. Other district facilities will be added to the fiber network as it becomes financially beneficial to do so.

Networking of computers will continue to expand at a dramatic rate, both within buildings and between buildings. The department will have an electronic mail system installed so that central staff and building staff can send messages and documents electronically.

The department will continue to work with the State of Iowa, Polk County, the City of Des Moines, Des Moines Waterworks, and other agencies to provide cost.effective telecommunications solutions where cooperative efforts are appropriate. Two major projects include the Iowa Communications Network which will provide fiber optic based video, voice and data service to educational institutions throughout Iowa. And a county-wide digital radio system that will provide an effective and reliable communication system serving the district, city, and county agencies.

Consultation Assistance

The department will add a technology support specialist to the staff to assume responsibilities for software support and supervising the computer repair technicians. This person will be a resource to district staff on the types of software that is available and provide maintenance support for major software systems. Also, the support position will work closely with Staff Development to provide support and advice on

the types of staff development courses needed by district technology users.

Technology Initiatives

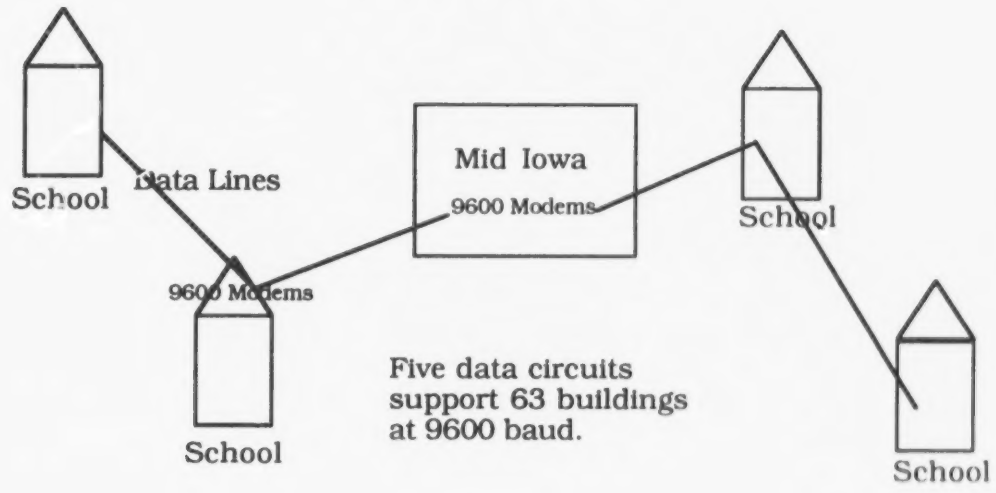
The department will coordinate the purchase and installation of twenty-three blackline duplicators to meet goal of replacing purple spirit duplicators by the end of the 1992-1993 school year. This will be $110,000 budget item for 1992-1993 school year. As the new duplicators are placed in the buildings, staff development on how to effectively use the equipment will be provided. As buildings make the shift to higher quality duplication their expenditures for printing also goes up. There is a need to have the duplication systems in the district be reviewed to see if more efficient process can be found.

APPENDIX A

The diagram shows how each of the schools in Des Moines are connected to Mid-Iowa Computer Center using data lines. Each building has at least one MS-DOS based microcomputer acting as a terminal. All of the high schools have two ET1100s that are used for attendance. Several buildings have Macintoshes connected to Mid-Iowa. This setup allows end users access to Mid-Iowa applications and have a workstation for office automation. One of the features of the micro/terminal emulation is file transfer between micros and mainframe.

This setup allows the buildings to score district tests and transfer data to the mainframe, maintain student information, record period by period attendance and suspension information, request repair work, order supplies from central stores, and have a microcomputer. Plans are to add personnel and payroll processing, the ability to download student data for use in planning, and an electronic mail system which will give building staff the ability to send electronic messages to central office staff or other buildings.

Diagram 1



Appendix B

The Technology Advisory Committee consists of the following members:

Mrs. Kathy Williams	General Services, State of Iowa
Mr. Don Andrew	Mid-Iowa Computer Center
Dr. Raymond Armstrong	Assoc. Superintendent
Dr. Earl Bridgewater	Assoc. Superintendent
Dr. Don Brubaker	Exec. Director Elementary/Early Childhood
Mr. Ray Clark	Community Representative
Mrs. Connie Cook	Principal Brody Middle School
Mr. Robert Davitt	Supervisor, Business Education
Mr. Lorenzo Jasso	Principal, Brooks Elementary
Dr. Tom Hoffman	Business Representative
Mr. John Klinkner	Business Representative
Mrs. Linda Lane	Supervisor, Human Resources
Mr. Ed Peterson	Supervisor, Science
Dr. Barbara Prior	Exec. Director, Middle & High Schools
Mrs. Marilyn Farr	Business Representative
Mr. Robert Wright Jr.	Parent
Mrs. Kathy Talcott	Parent
Mr. Paul Underhill	Accountant
Mr. William Schoenenberger	Coordinator, Technology
Dr. Morris Wilson	Director of Information Management, Chair

The Technology Committee consists of the following members:

Mr. Don Andrew	Mid-Iowa Computer Center
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Dr. Earl Bridgewater	Assoc. Superintendent
Dr. Don Brubaker	Exec. Director Elementary/Early Childhood
Mrs. Connie Cook	Principal Brody Middle School
Mr. Robert Davitt	Supervisor, Business Education
Mr. Lorenzo Jasso	Principal, Brooks Elementary
Mrs. Linda Lane	Supervisor, Human Resources
Mr. Ed Peterson	Supervisor, Science
Mr. Paul Underhill	Accountant
Dr. Barbara Prior	Exec. Director, Middle & High Schools Programs
Mr. William Schoenenberger	Coordinator, Technology
Dr. Morris Wilson	Director of Information Management, Chair

The Technology Consultation Committee consists of the following members:

Mr. David Albee	Community and Adult Education
Ms. Mariann Culver	Evaluation Specialist Technology
Dr. Tom Deeter	Program Evaluator Testing and Research
Mr. Tom Fergus	Information Systems Consultant
Ms. Vicky Gooch	Staff Development Specialist
Ms. Carol Gustafson	Pupil Accounting Specialist
Ms. Susan Swartz	Des Moines Plan Consultant